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Pesticide Fact Sheet Number 121: Prometryn

(U.S.) Environmental Protection Agency
Washington, DC

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National Technical Information Service
NTIS

United States
Environmental Protection
Agency

Office of Pesticides and Toxic Substances
Office of Pesticide Programs (TS-766C)
Washington, DC 20460

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EPA

Pesticide Fact Sheet

Name of Chemical: PROMETRYN
Reason for Issuance: REGISTRATION STANDARD
Date Issued: MAR 20 1987
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1. Description of Chemical

Common Name: Prometryn

Chemical Name: 2,4-Bis(isopropylamino)-6-(methylthio)-s-triazine

Other Names: Prometryne, Caparol, G-34161, Gesagard, Primatol Q, Prometrex

OPP (Shaughnessy) Number: 080805

Chemical Abstracts Service (CAS) Number: 7287-19-6

Empirical Formula: $C_{10}H_{19}N_5S$

Molecular Weight: 241.4

Year of Initial Registration: 1964

Pesticide Type: Herbicide

Chemical Family: Substituted triazine

U.S. and Foreign Producers: Ciba-Geigy Corp. (United States); Aceto Chemical Company, Inc. (U.S.); I.Pi.Ci. (Italy); Makhteshim-Agan (Israel); Verolit Chemical Manufacturing Company, Ltd. (Israel)

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2. Use Patterns and Formulations

Application Sites: Cotton, celery, pigeon peas, corn, ornamental plants, and forest trees (nursery seed beds)

Percent of crop treated with the Pesticide: (1) Cotton, 9 to 12 percent of total U.S. cotton crop; (2) celery, 95 percent of total U.S. celery crop

Percent of Pesticide Applied to Crop: (1) Cotton, approximately 97 percent (1,100,000 - 1,500,000 pounds active ingredient, [ai]) of total domestic usage of prometryn; (2) celery, approximately 3 percent (31,000 - 37,000 pounds ai) of total domestic usage of prometryn

Types and Methods of Application: Applied by broadcast or directed spray (preplant, preemergent, or postemergent) to crop and weeds using ground equipment or aircraft.

Pests Controlled: Annual broadleaf and grass weeds

Application rates: Rates range from 0.48 to 3.2 lb ai/A.

Types of Formulations: 95%, 97% active ingredient (ai) manufacturing-use products; 80% ai wettable powder; 44.4% (4 lb ai/gal) emulsifiable concentrate; 45.4% (4 lb ai/gal) flowable concentrate.

Usual Carriers: Water at 20 to 40 gal/A.

3. Science Findings

Summary Science Statement:

Based on available acute studies (oral, dermal), prometryn has low acute toxicity and falls within Toxicity Category III, signal word CAUTION. Data gaps exist for the technical in acute toxicity, subchronic and chronic toxicity, teratology, oncogenicity, reproduction, and mutagenicity. Prometryn is not acutely hazardous to birds. It is slightly toxic to freshwater invertebrates and moderately toxic to fish. The chemical may pose a risk to some endangered species. The environmental fate of prometryn is not adequately understood. Additional data are required on degradation, mobility, accumulation, field dissipation, and metabolism. Leaching studies indicate that prometryn has intermediate mobility in sandy loam soils and is very mobile in sandy soils. A ground water monitoring study may be required pending the results of additional leaching and soil field dissipation studies.

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13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, Science Findings

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement:	19. Security Class (This Report)	21. No. of Pages
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(See ANSI-Z39.18) See Instructions on Reverse OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

Chemical Characteristics:

Physical state: Powder

Color: White

Odor: Odorless

Melting Point: 118-120 °C

Density: 1.15 ± 0.02 g/cm^3 at 20 °C

Solubility: 33 ppm in water at 20 °C
readily soluble in organic solvents

Vapor Pressure: 1.3 x 10^{-6} mbar at 20 °C

Dissociation Constant: K_b = 4.11 ± 0.5

Octanol-Water
Partition Coefficient: pK = 4.1 at 20 °C

Stability: Stable in neutral, slightly acidic or basic media. Half-life at 25°C of 22.2 days and 1200 days in 0.1 N HCl and 0.1 N NaOH, respectively. Stable for a minimum of 3 years at room temperature.

Toxicological Characteristics

Acute oral toxicity (rat):	1802 mg/kg (males) and 2076 mg/kg (females); Toxicity Category III (97% ai)
Acute dermal toxicity (rabbit):	Greater than 2000 mg/kg; Toxicity Category III (97% ai)
Primary dermal irritation (rabbit):	Nonirritating to intact and abraded skin Toxicity Category IV (97% ai)

Chronic effects: The only available studies were done using formulated products. Data gaps remain for the technical materials.

Chronic feeding (dog):	No observable effect level (NOEL) = 3.75 mg ai/kg/day Lowest effect level (LEL) = 37.5 mg ai/kg/day (80% ai)
Teratology (rabbit):	Maternal and fetotoxic NOEL = 12 mg ai/kg/day; Developmental toxicity and embryotoxic NOEL > 72 mg ai/kg/day . (Formulated prometryn)

Major Routes of Exposure:

Mixers, loaders and applicators would receive the most exposure via skin/eye contact and inhalation.

Physiological and Biochemical Behavioral Characteristics:

Foliar and Root Absorption: Absorbed through both roots and foliage

Translocation: Translocated from roots to leaves

Mechanism of Action: Prometryn interferes with electron transport in the photosynthetic process.

Metabolism and Persistence in plants and animals: The nature of the residue of prometryn in plants and animals is not adequately understood. However, available data indicate the following: (1) In cotton, prometryn appears to concentrate in lysigenous glands where it slowly degrades to hydroxypropazine and other conjugated metabolites. (2) In the rat, most of the administered prometryn is excreted within 48 hours in urine and feces.

Environmental Characteristics:

Insufficient data are available to fully characterize the environmental fate of prometryn. Leaching studies do indicate, however, that prometryn has intermediate mobility in sandy loam soils and has high mobility in sandy soils. In addition, data indicate that prometryn has hydrolytic stability and is persistent in the soil. Degradation, accumulation, metabolism, soil field dissipation and additional leaching studies are required. Pending the results of soil field dissipation and leaching studies, a ground water monitoring study may also be required.

Ecological Characteristics:

Avian acute oral toxicity: Greater than 4640 mg/kg (mallard)

Avian dietary toxicity: 34,512 ppm (adjusted to 100% ai, mallard)

Aquatic invertebrate acute toxicity: 18.59 ppm (*Daphnia magna*)

Fish acute toxicity: 10 ppm (bluegill sunfish)

Fish acute toxicity: 2.9 ppm (rainbow trout)

Potential problems related to endangered species: The use of prometryn on corn and cotton may pose a hazard to endangered species. A single application per year of prometryn should not harm most animal species, due to its low toxicity, except by destruction or adverse modification of habitat. There is concern for the endangered species, Solano grass and Valley Elderberry longhorn beetle following a single application of prometryn on corn. Both species occur in California. Proposed labeling has been designed to protect these species.

If multiple applications per year are used on corn and/or cotton, then several endangered species may be exposed to potential harm (due to sufficiently high application rates and the half-life of prometryn). Proposed endangered species labeling has been designed to protect these species when there are multiple applications of prometryn.

The endangered species labeling, as mentioned above, will be required after the Agency receives concurrence from the U.S. Fish and Wildlife Service. The Agency will notify registrants, in a Pesticide Registration Notice, of the final label requirements for endangered species.

Tolerance Assessment:

Tolerances have been established for residues of prometryn in or on the following raw agricultural commodities:

Commodity	Tolerance (ppm)
Celery	0.5
Corn, fodder, field	0.25
Corn, fodder, pop	0.25
Corn, fodder, sweet[1/]	0.25
Corn, forage, field	0.25
Corn, forage, pop	0.25
Corn, forage, sweet	0.25
Corn, fresh (inc. sweet K+CWHR)	0.25
Corn, grain	0.25
Cotton[2/]	1.00
Cottonseed	0.25
Pigeon peas	0.25

[1/] This entry will be deleted from the tolerance expression, since corn fodder, sweet, is not considered a raw agricultural commodity of sweet corn.

[2/] A feeding restriction is currently in effect for cotton forage, thus the entry "cotton" (presumably intended to cover cotton forage) will be deleted.

Dietary Assessment:

The provisional acceptable daily intake (PADI) was based on a 2-year dog feeding study with a NOEL of 3.75 mg ai/kg/day. Applying an uncertainty factor of 1000,* the PADI was calculated to be 0.004 mg/kg/day. This is equivalent to a maximum permissible intake (MPI) of 0.24 mg/kg/day for a 60 kg individual. The theoretical maximum residue contribution (TMRC) of prometryn in the daily diet is 0.000205 mg/kg/day based on the existing tolerances and daily food intake of 1.5 kg, with 5.13 percent of the PADI being utilized.

Established tolerances are based on the parent compound. Additional metabolism studies are required in order to identify and quantify all metabolites of toxicological concern.

* It is not clear whether another species will prove to be more sensitive to prometryn than the dog, thus an uncertainty factor of 1000 was used.

4. Summary of Regulatory Position and Rationale:

Use, Formulation or Geographic Restrictions: No significant new food or feed uses of prometryn will be permitted until residue chemistry and chronic toxicology data are available to assess existing uses.

Unique Label Warning Statements: All end-use products shall bear the following statements:

a. Feeding/Grazing Restriction

Do not allow livestock to feed or graze on treated cotton crops.

b. Environmental Precautions

Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Do not contaminate water by cleaning of equipment or disposal of wastes.

5. Summary of Major Data Gaps:

Product Chemistry

All product chemistry data

Residue Chemistry

Metabolism studies (plants, livestock)
Residue analytical method
(plant & animal residues)
Storage stability
Residue studies

Toxicology

Acute inhalation (rat)
Eye irritation (rabbit)
Dermal sensitization (guinea pig)
21-Day dermal (rabbit)
Chronic toxicity (rodent)
Oncogenicity (2 species)
Teratology (rat)
Reproduction (rat)
Mutagenicity battery
General metabolism

Fish and Wildlife

Avian dietary (upland game bird)
Avian reproduction
(upland game bird and waterfowl)
Acute toxicity to estuarine
and marine organisms
Fish early life stage and
aquatic invertebrate life-cycle
Aquatic organism accumulation

Plant Protection

Seed germination/seedling emergence
Vegetative vigor
Aquatic plant growth

Environmental Fate

Hydrolysis
Photodegradation (water, soil, air)
Anaerobic soil metabolism
Leaching, adsorption/desorption
Volatility (lab)
Volatility (field)
Soil dissipation
Soil dissipation, long-term
Accumulation:
Rotational crops (confined)
Rotational crops (field)
Fish

6. Contact Person at EPA:

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Disclaimer: The information presented in this Pesticide Fact Sheet is for informational purposes only and may not be used to fulfill data requirements for pesticide registration and reregistration.